

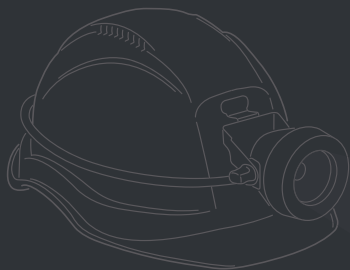
Wallarrah 2 Coal Project

Environmental Impact Statement

April 2013

Appendix F

Revised Environmental
Risk Assessment



WALLARAH 2 COAL PROJECT
REVISED ENVIRONMENTAL RISK ASSESSMENT
for
Wyong Areas Coal Joint Venture

Issue	Aspect	Impact	Preliminary Risk Assessment			Proposed Control Measures	Revised Risk Assessment		
			C	L	R		C	L	R
Subsidence	Surface disturbance associated with the subsidence of the land within the zone of influence	Disturbance of the natural environment	3	B	9, High	A Subsidence Impact Assessment has been completed for the Project by WACJV and the relevant technical experts, SCT Operations Pty Ltd and Mine Subsidence Engineering Consultants Pty Ltd.	3	C	13, High
		Disturbance of the built environment	3	B	9, High	These assessments have been carried out to identify any subsidence related issues (particularly with its potential affect on residential structures, water catchments and groundwater regimes) in the Project Boundary.	3	C	13, High
						Management and Mitigation measures have been recommended which include:			
	Underground mining resulting in subsidence	Unplanned movement of land resulting in significant environmental effects	3	C	13, High	- Develop and implement a detailed program for detecting and recording significant geological features and assess the potential impacts of these geological features on subsurface and surface structures; - Modify the mine plan if it is likely to result in unacceptable environmental impacts; - Contingency plans for longwall mining under steep rocky catchments to manage any unexpected seepages featuring release of soluble oxidized metals due to fracturing and localised redirection of drainage pathways; - Include measures to manage or mitigate any unexpected effects of subsidence leading to the creation of new wetland/depressions or increased potential for channel avulsion; and - Development of Subsidence Management Plan (Extraction Plan).	3	D	17, Med

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			C	L	R		C	L	R
Water Management	Construction of hardstand areas, stockpiles and dams	Dirty water runoff entering local waterways	2	B	4, Extreme	A Groundwater Impact Assessment was conducted for the Project by Mackie Environmental Research. A computer based mathematical model (MODFLOW SURFACT) has been developed to simulate the regional extent of depressurisation and to predict mine water influx. The model employs a numerical finite difference scheme for solving the differential equations that govern groundwater flow.	2	D	12, High
		Contamination of surface water runoff with sediment and salts	3	B	9, High	A Surface Water Impact Assessment was conducted for the Project by WRM Water & Environment. The assessment has included the preparation of a water balance and identification of water demands and supplies and the management requirements for the Project.	3	D	17, Med
	Coal extraction	Groundwater inflow into underground workings	3	D	17, Med	A Flood Impact Assessment was conducted for the Project by G Herman and Associates. The assessment has determined the potential impacts on flooding caused by predicted subsidence due to the proposed the Project. It represents a refinement of flood studies undertaken by Environmental Resources Management Australia Pty Limited (ERM) between 1999 and 2009.	5	A	15, Med
		Drawdown of aquifers on surrounding water users	3	D	17, Med	The assessment is based on more detailed hydrological and hydraulic modelling using the TUFLOW software package and utilises highly accurate topographic data for existing and post-subsidence conditions.	3	E	20, Med
		Cumulative impacts with surrounding users	3	D	17, Med	A Water Management Plan will be developed and implemented which will describe the management system to source, capture, divert, store, monitor and utilise water for the Project.	3	E	20, Med
	Production	Water demand for dust suppression	3	D	12, High	A primary aim of the management system will be to divert water from the upstream natural catchment around the operations where possible.	3	E	20, Med

Issue	Aspect	Impact	Preliminary Risk Assessment			Revised Risk Assessment		
			C	L	R	C	L	R
Ecology	Water discharges into local waterways	Surface water contamination	3	D	12, High	3	D	17, Med
		Contaminated water from infrastructure	2	B	12, High	2	E	16, Med
	Subsidence of land resulting in modified landform	Changes to flooding regime	3	B	9, High	3	C	13, High
	Vegetation clearing and topsoil stripping associated with surface infrastructure	Loss of biodiversity and disruption to threatened flora and fauna or likely habitats	2	B	4, Extreme	2	E	16, Med
		Disturbance to listed species, communities or habitat	2	C	8, High	2	E	16, Med
	Subsidence of land resulting in modified landform	Changes to habitat conditions for flora, fauna and aquatic organisms	2	B	4, Extreme	2	D	12, High
Proposed Control Measures			An Environmental Monitoring Program, which will include groundwater and surface water monitoring, will be developed and implemented throughout the life of the Project to validate predictions from this model. Appropriate licences for the interception of water will also be sought from NOW as required. An Ecological Impact Assessment has been completed for the Project by Cumberland Ecology. This assessment has identified the potential impacts of the Project on flora and fauna (including listed threatened flora and fauna species and vegetation communities). Management and mitigation measures include: • Development of a Biodiversity Offset Strategy that adequately compensates impacts of the Project; • Limiting vegetation disturbance areas as far as practical; • Safe removal of animals in advance of disturbance; • Removal (and relocation where practicable) of habitat features such as tree hollows from the Disturbance Areas; • Rehabilitation of disturbed areas to build of existing and future areas of native vegetation, conservation lands and natural corridors;					

Issue	Aspect	Impact	Preliminary Risk Assessment			Proposed Control Measures	Revised Risk Assessment		
			C	L	R		C	L	R
						- Dust minimisation, to reduce potential indirect impacts to vegetation condition and habitat quality in areas adjacent surface infrastructure; - Noise minimisation, to reduce potential indirect impacts to sensitive fauna species in areas adjacent surface infrastructure; - Erosion and sediment controls, to maintain habitat integrity and function in areas adjacent surface infrastructure; and - Lighting minimisation, to reduce potential indirect impacts to nocturnal fauna in areas adjacent surface infrastructure.			
Aboriginal Archaeology and Cultural Heritage and Historic Heritage	Vegetation clearing, drilling and topsoil stripping Surface disturbance associated with the subsidence of the land within the zone of influence	Disturbance of Aboriginal artefacts, sites or places of cultural heritage significance	3	B	9, High	An Aboriginal Cultural Heritage Assessment has been conducted for the Project by OzArk Environmental & Heritage Management in accordance with the <i>National Parks & Wildlife Act 1974: Part 6 Approvals, DECCW's Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010</i> and OEHs <i>Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW 2011</i> . An Aboriginal Heritage Management Plan will be developed to detail how all identified sites will be managed. This management plan will be developed in consultation with the Aboriginal stakeholders and relevant regulators.	3	C	17, High
		Disturbance of Non-Aboriginal heritage sites	4	C	18, Med	OzArk has completed an Historic Heritage Assessment in accordance with NSW Heritage Office's <i>NSW Heritage Manual</i> . A Historic Heritage Management Plan will be developed to detail how all identified sites will be managed. This management plan will be developed in consultation with relevant regulators.	4	D	21, Low

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Air Quality and Human Health Risk	Vegetation clearing and topsoil stripping	Wind blown dust and machinery exhaust fumes contributing to elevated dust levels	4	C	18, Med	An Air Quality, Greenhouse Gas and Health Impact Assessment was conducted for the Project by PAE Holmes in accordance with the NSW OEH "Approved Methods for the Modelling and Assessment of Air Pollutants in NSW" (Approved Methods) (DEC, 2005), the DGRs, and other relevant agency comments. WACJV will develop and implement a comprehensive Environmental Monitoring Program which will comprise Air Quality Monitoring for the Project. This Monitoring Program will provide a framework to manage monitoring, assessment and mitigation of air quality impacts on the local community. Management techniques for managing air quality impacts of the Project will include utilisation of a real time air quality monitoring system to proactively manage operations. Minimising disturbance areas, water cart deployment, enforced speed limits, drills fitted with dust suppressant, extensive dust suppression on haul roads and heavily trafficked areas, progressive rehabilitation and maintenance, alarm systems, efficient dumping and tipping operations will also be employed.	4	D	21, Low
	Coal stockpiles		4	B	14, Med		4	D	21, Low
	Coal processing and transport		3	D	17, Med		3	E	20, Med
Greenhouse	Coal Seam Gas extraction	Greenhouse gas emissions	3	B	9, High		3	D	17, Med
	Combustion of diesel fuel		3	D	17, Med		3	D	17, Med
	Use of Electricity		4	C	18, Med		4	D	21, Low
	Downstream Impacts from the transport and burning of Coal		3	B	9, High		3	D	17, Med
Noise	Train movements on rail loop and spur	Excessive Noise Generation	4	C	18, Med	A Noise and Vibration Impact Assessment was conducted for the Project by Atkins Acoustics in accordance with the Interim Construction Noise Guideline (DECC, 2009), Assessing Vibration: a technical guideline (OEC, 2006) NSW Industrial Noise Policy (EPA, 2000) and Industrial Noise Policy Application Notes. The assessment identified the potential noise and vibration impacts of the Project, including associated construction, infrastructure, traffic and rail noise.	4	D	21, Low
	Use of Coal Stockpiles		4	B	14, Med		4	C	18, Med
	Coal loading at rail loop		4	B	14, Med		4	D	21, Low

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			C	L	R		C	L	R
	Product Coal Transport		4	C	18, Med	WACJV will develop and implement an Environmental Monitoring Program which will include noise monitoring for the Project. This monitoring program will provide a framework to manage monitoring, assessment and mitigation of noise impacts on any surrounding private receivers. Management controls will include the assessment of mine planning, operational and engineering methods, real-time monitoring, and alarming systems.	4	D	21, Low
	Increased traffic movements		4	C	18, Med		4	D	21, Med
Visual and lighting	Operation of Coal Stockpiles	Visual impact to surrounding receivers	4	D	21, Low	A Visual Impact Assessment was completed for the Project by The Design Partnership to assess the potential visual impacts of the Project and identify mitigation and management measures, as appropriate. Management commitments will include the establishment of vegetation screens in key areas and consideration of night lighting.	4	E	23, Low
	Infrastructure areas and exposed earthworks		4	D	21, Low		4	E	23, Low
	Use of Lighting at Surface Facilities		3	C	13, High		3	D	17, Med
		Social Impacts	3	D	17, Med		3	E	23, Low
Socio-Economics	Employees residing in local region	Economic Impacts				A Social Impact Assessment was undertaken for the Project by Martin and Associates which developed a social profile for the Wyong Local Government Area. It aimed to identify any future social impacts which may result from the Project. WACJV will employ management strategies to mitigate identified social impacts from the Project. An Economic Impacts Assessment was completed by Gillespie Economics which undertook a benefit cost analysis which is the method used to consider the economic efficiency of the Project. The economic efficiency measures whether or not the incremental benefits of the Project to the community exceed the incremental costs to the community (i.e. economic efficiency).			
			3	D	17, Med		3	D	17, Med

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Land Management	Topsoil Stripping and land preparation for Surface Facilities	Loss of productive topsoil	4	D	21, Low	A Soils and Land Capability Impact Assessment was completed for the Project by Environmental Earth Sciences. The assessment included the mapping of the soil types within the Project Boundary, identification of any soil materials with potentially adverse quality (e.g. acid sulphate generating) and identification of the suitability of topsoils for use as topdressing material.	4	E	23, Low
		Deterioration of land capability	4	E	23, Low		4	E	23, Low
	Rehabilitation of surface facilities and possible surface cracks	Erosion and sedimentation, agricultural productivity	4	D	21, Low	The final rehabilitation works for the Project will be documented in a Closure Management Plan to be approved by DP&I within five years of closure and may include: • Tooheys Road Site will likely be left relatively intact for resale for industrial land use; • Buttonderry Site will be fully rehabilitated and revegetated to provide additional conservation areas, unless developed for a relevant industrial use; and • Western Ventilation Shaft will be fully rehabilitated.	4	D	21, Low
		Invasion of weed species or feral animals	4	E	23, Low		4	E	23, Low
Agriculture	Competition for land use	Loss of agricultural land to mining	-	-	-	An Agricultural Impact Statement was completed for the Project by Scott Barnett and Associates. The assessment included the mapping of agricultural enterprises and agricultural domains and assessment of the potential impacts on the agricultural resources and enterprises within the Project Boundary.	3	D	17, Med
Traffic and Transport	Use of public road/rail facilities by employees, deliveries and train loading	Increased traffic movements on public roads	4	C	18, Med	A Traffic and Transport Impact Assessment was completed for the Project by Parsons Brinckerhoff in accordance with the DGRs, Guide to 'Traffic Generating Developments' (RTA, 2002) and Department of Planning 1996, EIS Guidelines: Road and Related Facilities.	4	D	21, Low

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Road Upgrades	Safety and Public Perception		4	C	18, Med	The assessment has reviewed the capacity of the affected road network to cater for differing traffic volumes due to the change in traffic flows.	4	D	21, Low
						Road network enhancements that were identified for the Project will continue to be discussed with the RMS and WSC as required. Potential noise impacts from traffic have been assessed in the Noise and Vibration Impact Assessment.			
Waste Management	Generation of General waste	Land contamination	4	D	21, Low	A Waste Management System will be developed and implemented for the Project, which shall provide management procedures to ensure the environmentally responsible disposal, tracking and reporting of all waste generated on site.	4	D	21, Low
	Generation of Sewage	Water contamination	4	D	21, Low		4	D	21, Low
Hazardous Materials	Storage and Handling	Soil and water contamination	4	D	21, Low	All hazardous materials will be managed in accordance with the relevant hazardous materials management procedures.	4	D	21, Low
	Bushfire	Fire Hazard	4	D	21, Low	WACJV will develop a Bushfire Management Plan for the Project. WACJV will review and consolidate its management procedures for the Project in consultation with relevant regulators to the satisfaction of DP&I.	4	D	21, Low
Rail Assessment	Main Northern Rail Line	Increased volumes on rail line	-	-	-	A Rail Impact Assessment has been completed for the Project by RM Consultants Australia in accordance with the Project's DGRs. This assessment has identified the potential impacts of the Project on rail activities in the area.	4	D	21 Low
Forestry Assessment	State Forest	Loss of forestry resource	-	-	-	A Forestry Impact Assessment has been completed for the Project by GHD in accordance with the Project's DGRs. This assessment has identified the potential impacts of the Project on forestry.	4	D	21, Low

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			C	L	R				C	L	R
Contamination Assessment	Hazardous substance	Exposure to contamination	-	-	-	A Contamination Assessment has been completed for the Project by DLA Environmental in accordance with the procedures and requirements described in the NSW EPA Guidelines for Consultants Reporting on Contaminated Sites (EPA 2000), Guidelines for the NSW EPA Site Auditor Scheme (DEC 2006), Sampling Design Guidelines (EPA 1995), NEPC Guidelines "National Environment Protection Measure (Assessment of Site Contamination) Measure 1999 and NSW EPA and specifically SEPP55. Contamination Assessment documentation to approval of NSW EPA Site Auditor.			3	E	20, Low

WALLARAH 2 COAL PROJECT

Risk Assessment Tools

Matrix for Determining Level of Risk

Likelihood	Consequence				
	1	2	3	4	5
A	Extreme – 1	Extreme – 2	High – 6	High – 10	Medium – 15
B	Extreme – 3	Extreme – 4	High – 9	Medium – 14	Medium – 19
C	Extreme – 5	High – 8	High – 13	Medium – 18	Low – 22
D	High – 7	High – 12	Medium – 17	Low – 21	Low – 24
E	High – 11	Medium – 16	Medium – 20	Low – 23	Low – 25

Likelihood Scale

Level	Descriptor	Description	Indicative Frequency (expected to occur)
A	Almost certain	The event will occur on an annual basis	Once a year or more frequently
B	Likely	The event has occurred several times or more in your career	Once every three years
C	Possible	The event might occur once in your career	Once every ten years
D	Unlikely	The event does occur somewhere from time to time	Once every thirty years
E	Rare	Heard of something like the event occurring elsewhere	Once every 100 years

Consequences Scale

Severity Level	Consequences Types				
	Health & Safety	Natural Environment	Social/ Cultural Heritage	Community/Govt/ Reputation/Media	Legal & Regulatory
5	No medical treatment required or requiring first aid treatment at the most	Minor environmental effects (near the source, confined and quick to reverse)	Minor medium-term social impacts on local population. Mostly repairable	Minor, adverse local public or media attention or complaints	Minor legal issues, non-compliances and breaches or regulation. Low potential for impact
4	Objective but reversible disability requiring hospitalisation	Moderate, short-term effects on environment (near the source, reversible and confined)	On-going social issues. Permanent damage to items of cultural significance	Attention from media and/or heightened concern by local community. Criticism by NGOs	
3	Moderate irreversible disability or impairment (>30%) to one or more persons	Serious but confined medium term environmental effects near the source	On-going serious social issues. Significant damage to structures/items of cultural significance	Significant adverse national media/public/NGO attention	Serious breach of regulation with investigation or report to authority with prosecution and/or moderate fine possible
2	Single fatality and/or severe irreversible disability (>30%) to one or more persons	Very serious, long-term environmental impact that is widespread and unconfined, leaves major damage		Serious public or media outcry (international coverage)	Major breach of regulation. Major litigation. High potential for prosecution
1	Multiple fatalities, or significant irreversible effects to >50 persons				Significant prosecution and fines. Very serious litigation including class actions. Suspended or reduced operation